

FIG. 1A

1 TCGGGAAANGATTGATTGCCNCTCGNAAGGCNTTTATTTGCNNCAAGGAGGGCCCGGGGGTTCCAACCAATAAAATT 87
 88 TTTTTTCGGATCCCGGGTTCTCAGGGAGTTGGGAATTACTTGAAGCAGATNTTCNGAGNTCCGGTAGCTNTCCAAT 174
 175 AACTNTTTGTCATCATTGCCAGACGGCAGATCAAGGATGCCCTCGTTACCCGTGCTCAGAGAACGGCTTTGGAAGATTGAT 261
 262 TTAAGTTATTAAACAGTCACAGACAGGTGTCATNTGGAGAATAGAGGCAAGTCCGGGTGAGGGATGAAGCAGGAGAGATAGGG 348
 349 GAAGGCAGACAGGACTGCTGGCCAAGGAAGCTGCTGAGTCAGACAGTGGAAATTCACTACGCAATTCAAAGGCTTAGTG 435
 436 GTAAATTCTGAAGCTCAGATGCCAGGCAAGACCCAAAGAGGATACTGTACACAGAGAGAAGAGGCTNTCAGGATCGTGCGTAGAGTGG 522
 523 AGAGAGCCCCAAAGGCAGGAGGGAGAGCCTCAGTGGATTACTTAGGGATGAGGGAGAGAAGAAAAAGGTTCTGCAAGGTGTGG 609
 610 GTCTTCCAATTCAAGGAGTCAGTCACTGAACATAGAGAAGGTGAGGGGATGAAAGGGGCCATGTGATGAGGATGGCAAGCAGGCTGT 696
 697 GCGCGAGATGACGAGATGCCCTGGTCGGAGGTCAAGGGAGACCCAGGATTGGGTACCTCTCTGCCAGAGGGGAAGCCACCC 783
 784 TGCAACTGGCCCAAGCACTGAGTCCAGAGGAAAATGAGGCAAGGACAAACCAGAGCTCGGAGACTAAGTGCAGGTAGGGCGGGC 870
 871 GGAGCGTGAGGAGGGCAGCGGACCACCGAGAGGCAAGGCCACCGGACCCGCGTCCGAGAGTCTGAGGGCCCTGCCACACCT 957
 958 GCGRGGCCCCCTCCCCAGAGGCCACACTCCAAGGCCACCCCTAGAACCCGTCGTCTGCTCAAGGCCCTGCAAAAGACGTCGCGCAG 1044
 1045 AGGGGGCGTGGCAGGCGTGTGTCACTCACGGCCTGTTAGCCAATCCACGAGTGCAGGCCCTCCCCGGAGAGGGTGCAGGCC 1131
 1132 GCCCCCGCCGCCACCCGGGTGTAGGAGGCCAGGCTGGCGCGCTCCCTCCGCCCGCAGGCTTGCCAGGTAACCGGGTTGGCGGG 1218
 1219 GAGGGCTGGGGTCGCGCAGCCCCCTCGCTCCCTGGAGGCGTGCACACTGCCCGGGGTCCCGTGTGGCCGGAGGCCGTGCG 1305
 1306 CGCGTCGGACCGACGGCCAGCCCTGTGGCGGGGTGCGTGCACGGGCCGTGCCCTGGCGTGTGGCGGGTGTGTCAGGCCCTGCGCGGG 1392
 1393 GAAAGCTCGCCGAACCGAGGTGTCCAGGTCCGGCCCTGCGGCCCTGCCCCGGTGGGGGCCAGGCCGGGTGGCGGGGT 1479
 1480 CGTCCCAGGAGCGTCTTGTTCGGCGCGCTGAGGGCGGAGCCTCACCCGCCCGCGCTCACTCCCCGCCGTGTCAGTCCCAGGCCGTCC 1566
 1567 GCGCGAGGAGCTGCCACCGGGTCCGCTGGCCTCCCGGCCACCGCCTCCGCCCTGGCGTCCGGCCGCCGTG 1653
 1654 GTGCCGAGGTGCTGCAGCATGGCGNGCGTGCACCCCTGCCAACGGCTGCCAGGGCTGGCGACCCCTCCGAAGGCCAGGTGC 1740
 M A ? V A T P C A N G C G P G A P S E A E V L

1741 TGCACCTCTGCCAGGCCCTGAGGTGGCACCGTCACTTGTCTACTCCAAGAAGTCGAGGCCAGAACGGAGANCTTCC 1827
 H L C R S L E V G T V M T L F Y S K K S Q R P E R K ? F Q

1828 AGGTCAAGTTGGAGACGCCAGATCACATGGAGGCCGGGACAAAATGAGGGTCCAGTAAGTGCAGGCCACTCCGGCTG 1914
 V K L E T R Q I T W S R G A D K I E G S S K C A P L R P A

1915 CCTCGGCCCTGCCGCCCTCCAAACACTTGGCAAACCTTGGCTCGGCCCTGGGCCCTCCGCCAGTCCCTGGTGGTCA 2001
 S R L P A S Q T L G Q T F G P R A W R P V S A Q S L V V T

2002 CTCTGGGGGGGTGGAGGGGGCATCCGGTCTGGATCACCTGATAGGACACCCCTCCCCAGTAGGGGGAGTGTCCAGGCA 2088
 L G R V E G G I R V L D H L I G H P L P Q *

2089 CTTGCCCTGAGGCCCTAACAGTCCTCACTGGTGGACAAGTGGAGTGGATTCCGGCCCTTAGCATGGCGGTGTCAGTGGCTGT 2175
 2176 GAGGGGAAGCCAAGACAGGGACCCCTCATCCAAACCTGAGAACCTGGGAACCCACAAGATCTCTGCCACTGCCATTCTCCAG 2262
 2263 AGTGTGCTGTGAAACTCTAACAGCTCCGGGATGGCTTATGGCGCAAGAACCTTGGATGAGACTAGTAAAGCTAAACCGTG 2349
 2350 GATGTTGGGTAGGGCTGGTGGTAAGCAGAGGCCCTACTCATCTCCCTCTTGGAGATGGGTATGAAAGCTAAACCGTG 2436
 2437 ACTGCTTCCCCCTCCCATGTCGGTGGATGGTTTTTTTTGGCCCTGAGATCTGAATTGGAGGTCCATGGTGCTA 2523
 2524 GGCAGCCATCAAAGCTAGAGCCATGGCTCTTGCCTTGAGCATATAACAAGGAGCTTGCAATTAGAAAGGTCCCTGGCCTTG 2610

FIG. 1B

2611 GGTTTGGGTCCAGCCCTTGTGTTGGATGTTCTCGTACCCAGGGTAGCCCANAGTGCTCCTCTGGTTCCGTACCCCTT 2697
2698 CCCAACCTGAGTGTGGTGGTTACACACAAGTCTCTGGGGAGAAGTAAGTCAGGAGTTGAGAAACCTCGGCTCTTGTGAT 2784
2785 AGTCATTTCTCGGTGAGGCAGGATGAGGAGTCCTTGCAACTCCAGGCTTGAGATGTTCTACAAGAACCCCCAAAGAGTCT 2871
2872 ATGGTTGAAGGGACCTAGCTTAAGAGCCAGGTCTGTGTTAGAGAAGGGGGGTGGTGTCAAGGAAGTAACAAACGGCGAGAAGGTCCA 2958
2959 CAGATCTTCCCTGGGGATGGTGTACATGTGTCATGGGTGAGGAGATGAGGAGGAAGGAAGGTTCTGTGTAAGACAGCCATCCT 3045
3046 CAACTACAAACTTCAGGTCTGACAGAATTGGCCCTTAACCATCACAGTGCCCATCAGCCCTGGCTCCGCTGGAAGAACATTTCAG 3132
3133 TGATTTCACTGTTGGGGATGGAACGTGAGACAGTCCGGTAGTCTGAGACATCACTCAGACATCAGGTTGCAAGGCATGGCATT 3219
3220 TACCTTGTAGTATTTCCTGTGTTAAGTGGTGGCATAGTTCCCCGTAGCTAGCTCTGGTAACAGCTGCACTGTAACCCGTGTG 3306
3307 TGTAGCCCAGTAGTGGAAAGATAGCTATGGTATTGAAAGCCAGTGTGTTAGCTGACGTCACCCAGCCAGGTCTTCCCTCTCGGAG 3393
3394 CCTCGGTTCTCTGTAAGTTAGCAGAAGTATTTACTATAATGGTCACTTTGGAAGTGAGATAGTTGGTAAAGTAAGCAAAC 3480
3481 TAAATATGTAATAGATGCGAGCAGAGACGTTACAGAAAGTTAAGAACCAAGTTATTAGTAGCAGTAGCTATGGTAGATGCTGTGCTC 3567
3568 CTAGACCCCTGGGATGGGCTCTGAGGGAGGTCTAATGTGGCTGTTAGAAAAAGAAAGGGCTTGAGGGAGGAGGGCCAGAGAGGG 3654
3655 TCCCGTTCTCCTTAATTGCAATTACCCAGGATAAAAGAGGAAACTCTGTTTGCGTACATCGTTACCCCTCTGTCACCTGTCT 3741
3742 GTAAGATGAGTTCTATGTTGGAATTGTCATTTGAGATTGCAATTGGCTGAGTTGGGCTGGACAGAAAGAAGGACTAGAGACAG 3828
3829 AACCATCCAGTCCGTTTGTCACTTGGCTTTGAGGATGGGCTGGCAGGAATACAGAGGACGTCACCTTCCAGACCCAGAAAAG 3915
3916 TCACCCAGAGATATGCAATTGGGCCCCACCAACCGAAGGCCCTGCCCCACTCTGCTGGAATGCACTGCTTGTGGGTTCCAAAC 4002
4003 TTCATACCTTGTAAATGGGAGCCCACCAACCGAAGGCCCTGCCCCACTCTGCTGGAATGCACTGCTTGTGGGTTCCAAAC 4089
4090 TGCAGCCTCTGCAATTGGGAGGTTGAGTTGGCTGAGCTGGCAGCTCCCTCCACTGCTGGCTCTGTTCAAGTGCTCAGGTATTG 4176
4177 ACTTTTGCTGATAACCTTATCCCTACCTGAAGCCAGGCCAGAGAGAAAGACTGCCCTGCTGCCCTCAGGTGCTACGGAAACAC 4263
4264 AACGACAGGGTCACTGCCATTTCCTAAATCTGAGTTCTCACTGTGACACCTGTGAAACTAGTTAGCACCTCTGATGTCTAAGG 4350
4351 CAGCGGCTACTTGAGAAGTGCTTGGTGTGTTGGTGTGACTGAAACTCAGGCTGGTGTGCTGGCATTATGTTGCAAGAATTAA 4437
4438 GTGAGTTAAAGCAGCCATAGACTCCCTGCCAGTGCTAAACAGACTTTCACTCTGCTGCAAGGCTAGTCAGAGGACTCTGCTC 4524
4525 CCAGGTGTTGGTGTGGTAGGCCTGGCTCCTGTTCTGTAAGCTTGTGCTGAGGATGGCTTGTGAAGAGAAACCTCATGTTAGGTGG 4611
4612 TATTACAGGCAGAGACCTCCATCTCATCAAAGACGCCCTCCTAGGTTTCCATATGTAATGCCCTAGTGAAGATGGCTCAGACCT 4698
4699 ATTCTTCGTGAGGTGTCAGTTAAGGACCACTGTTGGCATAGTAGCTCCAGTAGAGACTCTAAAGCTATGTTGTTATGTGGTGAG 4785
4786 GATTGCACTTCAAGGGCTGGCTCTGAGAGTAGGTCCGTGGCACCTAAGAATTGTCACATGCTCCCTCAAGGATTCTTTNGC 4872
4873 TGGCCACAGTGAGAGAGCAGCAGAAAGCATGCCCTGGATCTAAGAAAGGTTAATGAAACCATGGTACCTATGGAGCTTACAAC 4959
4960 CTGGCTCTGCTCCGTAGCCATTCTAAAGANATTGAAATTGTTGAGATTGAAAGATGTTCCCTACTATTCCCTTACATC 5046
5047 CTGAGGATCACGAAAGATTGCTTCACTATTAAATTAAAGAACCTATGAAAAGATATCAATGGACAGTCTTCCAC 5133
5134 AAGGCATGGCTAATAATCCTACCTTATGTCACAAATTGTCAGGACAACATTACCTGTGAGACACAATGACTATGACTACTCNC 5220
5221 ATGATGATGANGATGATGAGATGATGATGATGACACACAMGATAGAGATGATTCTAANGCGAAANATCCGACTGCT 5307
5308 TTNCCTAAAATTACCNNCCTNCGAAAAGATTAAACCCGAAAGGTCAACCGATCTATATTNGTTAANTNATACCGTTCCAAAATT 5394
5395 TTNCGGACCTNAANTTNATCAATTGTTATGNTCCCC 5434

FIG. 2A

FIG. 2B

FIG. 2C

FIG. 2D

FIG. 2E

CAAATTATATT (AAAA) 29

FIG. 2F

1 CCTGCGTCCT TCCTCCTTT CCTCCTTCCC TCCTCCCTCC CGGGTAATTT
51 ATTTCTAGCT TCCAGGCAAG GGCCACACAA GGAAGGAAAT CCACAGGGGA
101 TTAGATGCCG GGGTGGTAAC TCCACCAGGA TAGGTTGGAC TCTGCAGCCA
151 ACTTCCTATC AGATCACCCCT GCACCTATT CCGACCCGAC CGGAATGCGA
201 CTGGCTTGAG GTCCAGCCCT TTCGCCTGGG CGGGAGCAGA GCCGCGGAAG
251 CTFCTTGGAG TTGGATGGGG GTAGGAAGGG GCTGGAGCGG GAATCCTACG
301 ATGCAACTGG CCTGGGCCTA AGGTTGGGCA TAATGGAGTT GCAGAGGACA
351 TCCAGCGTTT CAGGGCCGCT GTCGCCGGCC TACACCGGGC AGGTGCCTTA
401 CAACTACAAC CAACTGGAGG GAAGATTCAA ACAGCTCCAA GATGAGCGTG
451 AAGCTGTACA GAAGAAGACC TTCACCAAGT GGGTCAATTG CCACCTTGCA
501 AGAGTGTCCCT GCCGAATCAC AGACCTGTAC ACGGACCTTC GAGATGGACG
551 GATGCTCATC AAGCTACTGG AGGTCTCTC TGGAGAGAGG CTGCCTAAAC
601 CCACTAAGGG ACGGATGCGG ATCCACTGTC TGGAGAATGT CGACAAGGCT
651 CTTCAATTCC TGAAAGAGCA GAGAGTCCAT CTTGAGAACAA TGGGCTCCCA
701 TGACATTGTG GATGGAAACC ACCGGCTGAC CCTCGGCCTC ATCTGGACAA
751 TTATTCTGCG CTTCCAGATC CAGGATATTA GTGTGGAGAC TGAAGATAAC
801 AAAGAGAAAA AGTCTGCTAA GGATGCATTG CTGCTGTGGT GCCAGATGAA
851 GACAGCTGGG TACCCCAATG TCAACATTCA CAATTTCACC ACTAGCTGGA
901 GGGATGGCAT GCCCTTCAAT GCACTGATAC ATAAACATCG GCCTGACCTG
951 ATAGATTTG ATAAACTGAA GAAATCTAAT GCACACTACA ATCTGCAGAA
1001 TGCATTTAAC CTGGCAGAGC AGCACCTTGG CCTCACTAAA CTGTTAGACC
1051 CTGAAGATAT CAGTGTGGAC CACCCGTATG AGAAGTCTAT CATCACATAC
1101 GTGGTGACTT ACTACCCTA CTTCTCCAAG ATGAAGGCCT TGGCTGTCGA
1151 AGGAAAGCGC ATTGGAAAGG TGCTTGATAA TGCTATAGAA ACAGAGAAAA
1201 TGATTGAGAA GTACGAGACA CTTGCTTCTG ACCTTCTGGA GTGGATTGAA
1251 CAAACCATCA TCATCCTAAA CAACCGCAAA TTTGCTAATT CACTGGTTGG
1301 GGTCCAACAG CAGCTCCAAG CATTCAACAC GTACCGCACA GTGGAGAAC
1351 CACCTAAGTT TACTGAGAAG GGGAAATTGG AGGTGCTCCT TTTCGCGATT
1401 CAGAGCAAGA TGCGAGCGAA TAATCAGAAG GTCTACATGC CCCGCGAGGG
1451 GAAGCTCATC TCTGACATCA ACAAGGCCTG GGAAAGACTG GAAAAAGCAG
1501 AACATGAGAG AGAACTGGCT CTGCGGAATG AGCTCATACTG GCAGGAAAAA
1551 CTGGAAACAAG TCGCCCGAAG ATTTGATCGC AAGGCAGCTA TGAGGGAGAC
1601 ATGGCTGAGT GAAAACCAGC GTCTTGTGTC TCAGGACAAC TTTGGATTG
1651 ACCTTCCCGC TGTTGAGGCT GCTACCAAAA AACACGAGGC CATTGAGACA
1701 GACATCGCTG CATATGAAGA ACGAGTTCAAG GCCGTGGTGG CTGTGGCCAG
1751 GGAACATTGAA GCCGAGAACT ACCATGACAT CAAGCGCATC ACAGCGAGGA
1801 AGGACAATGT CATCCGGCTC TGGGAATACT TGCTGGAACT GCTCAGGGCC
1851 AGGAGGCAGC GTCTTGAGAT GAAACCTGGGA TTGCAAAAGA TATTCCAGGA
1901 AATGCTTTAT ATTATGGACT GGATGGATGA AATGAAGGTG CTATTGCTGT
1951 CTCAAGACTA TGGCAAACAC TTACTTGGTG TTGAAGACCT GTTACAGAAG

FIG. 2G

2001 CATGCCCTGG TTGAAGCAGA CATTGCAATC CAAGCAGAGC GTGTAAGAGG
2051 TGTGAATGCC TCTGCCAGA AGTTTGCAAC AGATGGGGAA GGCTACAAGC
2101 CATGTGACCC CCAGGTAATT CGAGACCGTG TTGCCACAT GGAGTTCTGC
2151 TATCAAGAGC TTTGTCAGCT GGCTGCCGAG CGTAGGGCTC GCCTGGAAGA
2201 GTCCCGTCGC CTCTGGAAGT TCTTCTGGGA GATGCCAGAA GAGGAAGGCT
2251 GGATACCAGA GAAGGAAAAG ATCCTGTCCT CTGATGATTA CGGGAAAGAC
2301 TTGACCAGTG TCATGCGCCT GCTGAGCAAG CACCGGGCAT TTGAGGATGA
2351 GATGAGTGGC CGTAGTGGCC ATTTGAGCA GGCCATTAAA GAAGGTGAAG
2401 ACATGATTGC AGAGGAACAC TTTGGATCGG AAAAGATCCG TGAGAGAATC
2451 ATTTATATCC GGGAGCAGTG GGCCAACCTG GAACAGCTCT CAGCCATTAG
2501 GAAGAACGCG CTAGAGGAAG CCTCATTACT GCACCCAGTTC CAGGCTGATG
2551 CTGATGATAT TGATGCTTGG ATGTTAGATA TACTCAAGAT TGTCTCCAGC
2601 AATGATGTGG GCCATGATGA GTACTCCACG CAGTCTCTGG TCAAGAACGA
2651 TAAAGATGTA GCAGAACAGA TCACCAACTG CAGGCCCACT ATTGACACAC
2701 TGCATGAGCA AGCCAGTGCC CTTCCACAAG CACATGCAGA GTCTCCAGAT
2751 GTGAAGGGCC GGCTGGCAGG AATTGAGGAG CGCTGCAAGG AGATGGCAGA
2801 GTTAACACGG CTAAGGAAGC AGGCTCTGCA GGACACCCGT GCCCTGTACA
2851 AGATGTTCAAG TGAGGCTGAT GCCTGTGAGC TCTGGATTGA CGAGAAGGAG
2901 CAGTGGCTCA ACAACATGCA GATCCCAGAG AAGCTGGAGG ACCTGGAAGT
2951 CATCCAGCAC AGATTGAGA GCCTAGAAC AGAAATGAAC AACCAGGCTT
3001 CCCGGGTTGC TGTGGTGAAC CAGATTGCAC GGCAGCTGAT GCACAATGGC
3051 CACCCCAGTG AAAAGGAAAT CAGAGCTCAG CAAGACAAAC TCAACACGAG
3101 GTGGAGTCAG TTCAGAGAAC TGGTGGACAG GAAAAAGGAT GCTCTTCTGT
3151 CTGCCCTGAG CATCCAGAAC TACCACCTCG AGTGAATGA AACCAAATCC
3201 TGCATCCGGG AGAACGACAA GGTCATCGAG TCTACCCAAG ACCTGGCAA
3251 TGACCTGGCA GGTGTATGG CCCTGCAGTG CAAGCTGACT GGCATGGAAC
3301 GAGACTTGGT AGCCATTGAG GCGAAGCTGA GTGACCTGCA GAAAGAAGCT
3351 GAGAAGCTGG AGTCCGAGCA CCCTGACCAG GCTCAAGCTA TCCTGTCTCG
3401 GCTGGCCGAG ATCAGTGATG TGTGGGAGGA AATGAAGACA ACCCTGAAGA
3451 ACCGAGAGGC CTTCCTGGGA GAGGCCAGCA AGCTGCAGCA GTTTCTGCGG
3501 GACTTGGACG ACTTCCAGTC TTGGCTCTCC AGGACCCAGA CTGCTATCGC
3551 CTCAGAGGAC ATGCCCAATA CCCTCACTGA GGCAGAGAAG CTTCTCACAC
3601 AGCACGAGAA TATCAAAAT GAGATCGACA ATTATGAGGA AGACTACCAG
3651 AAGATGCGGG ACATGGGCGA GATGGTCACC CAGGGGCAGA CTGATGCCCA
3701 GTATATGTTT CTGCGGCAGC GGCTGCAGGC CTAGACACT GGCTGGAATG
3751 AGCTCCACAA AATGTGGGAG AACAGGCAA ACCTCCTCTC CCAGTCCCAT
3801 GCCTACCAGC AGTCCTTAG GGACACCAA CAAGCTGAAG CTTTTCTTAA
3851 TAACCAGGAG TATGTTTGG CTCATACTGA AATGCCACC ACCCTGGAAG
3901 GAGCTGAAGC AGCCATTAAA AAGCAGGAGG ACCTCATGAC CCACATGGAT
3951 GCCAACGAGG AGAAGATCAA TGCTGTTGTG GAGACTGGCC GAAGACTGGT

FIG. 2H

4001 GAGCGATGGG AACATCACCT CCGACCGCAT CCAGGAGAAG GTGGACTCTA
4051 TTGACGACAG ACACAGGAAG AATCGAGAAG CAGCCAGTGA ACTTCTGATG
4101 AGGTAAAGG ACAACCCTGA TCTACAGAAG TTCCCTGCAAG ATTGTCAAGA
4151 GCTGTCCCTC TGGATCAATG AAAAGATGCT TACAGCTAA GACATGTCCT
4201 ATGATGAAGC CAGAAATCTG CACAGTAAAT GGTTAAAGCA TCAAGCATT
4251 ATGGCGGAAC TTGCATCCAA CAAAGAATGG CTTGACAAAA TTGAGAAGGA
4301 AGGAATGCAG CTTATTCAG AAAAGCCAGA AACAGAAGCT GTGGTAAAGG
4351 AAAAACTCAC TGGTTTACAT AAAATGTGGG AAGTCCTTGA ATCCACAACC
4401 CAGACCAAGG CCCAGCGGCT CTTGATGCA AATAAGGCTG AGCTTTCAC
4451 ACAAAAGCTGC GCAGATCTG ACAAAATGGCT ACATGGCCTG GAGAGCCAGA
4501 TTCAATCTGA CGACTATGGC AAAGACCTTA CCAGTGTCAA TATTCTCTG
4551 AAAAAGCAAC AGATGCTGGA GAATCAGATG GAAGTTCGGA AGAAAGAGAT
4601 CGAGGAAC TG CAGAGCCAAG CCCAGGCCT GAGTCAGGAG GGGAAAGAGCA
4651 CAGATGAGGT GGACAGCAAA GCGGTTACTG TG CAGACCAA GTTCATGGAG
4701 CTTCTGGAGC CCTTGAGTGA GAGGAAGCAT AACCTGTTAG CTTCCAAGGA
4751 GATCCATCAG TTCAACAGGG ATGTGGAGGA CGAAATCCTA TGGGTTGGCG
4801 AGAGGATGCC TTTGGCAACT TCCACAGATC ATGGCCATAA CCTTCAAAC
4851 GTGCAGCTGT TAATAAAGAA AAACCAGACC CTCCAGAAAG AAATCCAGGG
4901 ACACCAGCCT CGTATTGATG ACATCTTGA GAGGAGTCAA AACATCATCA
4951 CAGATAGCAG CAGCCTCAAT GCCGAGGCTA TCAGGCAGAG GCTCGCTGAC
5001 CTGAAGCAGC TGTGGGGGCT CCTCATTGAG GAAACTGAGA AACGCCATAG
5051 ACGGCTGGAG GAGGCACACA AGGCGCAGCA GTACTACTT GATGCAGCTG
5101 AAGCCGAGGC ATGGATGAGT GAACAGGAGT TGTACATGAT GTCTGAGGAA
5151 AAGGCCAAGG ATGAGCAGAG TGCTGTCTCT ATGTTGAAAA AGCACCAAGAT
5201 TTTAGAGCAA GCTGTTGAGG ACTATGCAGA GACAGTACAC CAGCTCTCCA
5251 AGACTAGCCG GGCGCTGGTG GCTGACAGCC ATCCCGAAAG TGAGCGTATT
5301 AGCATGCGGC AGTCAAAGGT CGACAAGCTG TATGCTGGCC TGAAGGACCT
5351 TGCTGAGGAG AGGAGAGGAA AACTTGATGA GAGGCACAGG CTGTTCCAGC
5401 TCAACAGAGA GGTGGATGAC CTGGAACAGT GGATCGCTGA GAGGGAAGTG
5451 GTCGCAGGCT CCCATGAGTT GGGACAGGAC TATGAGCATG TCACGATGTT
5501 ACAAGAACGG TTCCGAGAAT TTGCTCGAGA CACAGGAAAC ATTGGGCAGG
5551 ACGCTGTGGA TACAGTTAAT AACATGGCAG ATGAACCTCAG CAACTCTGGA
5601 CATTCAAGATG CTGCCACCAT TGCTGAGTGG AAAGATGGTC TCAATGAAGC
5651 CTGGGCTGAC CTCCCTGGAGC TCATTGACAC AAGAACACAG ATTCTTGCTG
5701 CCTCATATGA ACTTCATAAG TTTTACCATG ATGCCAAGGA GATCTTGGC
5751 CGAATCCAGG ACAAACACAA GAAACTCCCT GAGGAGCTTG GAAGAGATCA
5801 AAACACTGTG GAAACTTTAC AGAGAATGCA CACCACCTT GAGCACGACA
5851 TCCAAGCTCT GGGCACTCAG GTGAGGCAGC TGCAGGAGGA TGCAGCTCGC
5901 CTCCAGGCAG CCTATGCAGG GGACAAGGCT GATGACATCC AGAAGCGTGA
5951 GAATGAGGTC CTGGAAGCCT GGAAGTCCCT GCTGGATGCT TGTGAGGGTC

FIG. 2I

6001 GCAGGGTGC GCTGGTAGAC ACAGGGAGACA AGTTCCGSTT CTTCAGCATG
6051 GTGCGTGACC TCATGCTCTG GATGGAAGAT GTCATCCGGC AGATCGAGGC
6101 CCAGGAGAAA CCACGGGATG TGTCACTCTGT TGAACCTGTTA ATGAATAATC
6151 ATCAAGGTAT CAAAGCTGAA ATTGATGCTC GTAATGACAG CTTTACAGCC
6201 TGCATTGAGC TTGGGAAATC CCTGCTGGCA CGGAAACACT ATGCTTCTGA
6251 GGAGATCAAG GAAAAGTTAC TGCAGCTGAC AGAGAAAAGA AAAGAAATGA
6301 TTGACAAGTG GGAAGACCGG TGGGAGTGGT TAAGACTGAT TTTGGAGGTC
6351 CATCAGTTCT GAAGGGATGC CAGTGTGGCA GAGGCTTGGC TGCTTGGACA
6401 GGAACCATACT CTATCCAGCC GTGAAATTGG CCAGAGTGT A GACGAAGTGG
6451 AGAAGCTTAT TAAGCGCCAT GAGGCCTTG AAAAGTCTGC AGCGACCTGG
6501 GATGAGAGAT TCTCTGCTCT GGAAAGGCTG ACAACGTTGG AGCTACTGGA
6551 AGTGCAGAGA CAGCAAGAGG AAGAAGAAAAG AAAGAGGCGG CCACCTTCTC
6601 CGGACCCAAA CACGAAGGTT TCAGAGGAGG CTGAGTCCCA GCAATGGGAT
6651 ACTTCAAAAG GAGACCAAGT TTCCCAGAAT GGTTTGCAGG CTGAGCAGGG
6701 ATCTCCACGG GTTAGTTACC GCTCTCAAAC GTACCAAAAC TACAAAAACT
6751 TTAATAGCAG ACGGACAGCC AGTGACCATT CATGGTCTGG AATGTGAAGT
6801 TCACTACCAC TTGTCAAGAA CCACTCTGTC CACATCCTT GACCTTTGG
6851 CTTCCACGTC ACCCAGAGTG TTAAAATTG TACTTAATTC ATAGCTGTCC
6901 TTGATTTCAT ATTTGTTGC ATTTAATTG TGTTTCTTG GATCCTCATT
6951 GCCTGAAAGC AGCATACTTA ATTTTTGTTT ATTTATTGTG A

FIG. 2J

FIG. 3A

1 TTGGAACAGTTACTTCAGTGGAGGCAGCAGAAATGAGGCTAGTCCAGACTCACAGGAATAGGTTCCATTCTCAAGAAGATGATTAA
88 AAGTAATTATCCTTACGCATAGTTATCATCACCAACAAAAAGATTCCAACCTTTCCACAGAACTATTATGATTATTTTATAT
175 GAATGTATGTATTATTATGAACTCCTATAATGATCACCTTACATATTACATTTCTTAATAATTAGTTAGCCCGTCC
→ W57358, W47742
262 GGAGGTCCGACAGCTCTGCAGCTCCAGCGCGACTAGCCAGAAAGTTCAAGGCATCCATGAGCCACCAGGAAAGGATGCCAGC
M S H Q E R I A S
349 CAGAGGAGGACAACAGCCGAAGTCUCAATGCACAGATCAACTGCCAATCAAAGCAAGAGGAGCCGGTCAACCATTGCCAGCACACGT
Q R R T T A E V P M H R S T A N Q S K R S R S P F A S T R
436 CGTCGCTGGATGACAGCGAGAGCTGGGAGCCAGCCTGGCTGTTGAGAGTGAGGATTATTCCAGGTGGCGGGATGCTGCCGATGCT
R R W D D S E S S G A S L A V E S E D Y S R W R D A A D A
523 GAGGAGGCTCATGCCAGGGCTAGCCAGAAGAGGCGAGGTGAGGCTGCCAGCAGCTCAGAGCCAAGGTATGCTGAAGACCAGGAT
E E A H A E G L A R R G R G E A A S S S E P R Y A E D Q D
610 GCCAGGAGTGAACAAGCGAAGGCAGACAAAGTCCAAGACGGCGGAACCATGGCAGACCCCTGACTTCTGGCATAACCCGACGAT
A R S E Q A K A D K V P R R R R T M A D P D F W A Y T D D
697 TACTACCGATACTACGAGGAAGATTCTGACAGCGACAAAGAGTGAGGCTGCCCTGCGCAGGAAGTACCGAAGCCGAGAGCAACCC
Y Y R Y Y E E D S D S D K E W M A A L R R K Y R S R E Q P
784 CAGTCCTCCAGCGGAGAAAGCTGGAGCTCTGCCAGGAAGGAAGAACCTGGAACGTCAGCAAGCCGGAGCTGGAGGCTGCCAGT
Q S S S G E S W E L L P G K E E L E R Q Q A G A G S L A S
871 GCTGGCAGCAATGGCAGTGGTATCCTGAAGAACTACAAGACCCATCTCTCAGGAGGAAGAACAGGCCTCTGGAAGAAGGAGAA
A G S N G S G Y P E E V Q D P S L Q E E E Q A S L E E G E
958 ATCCCTGGCTTCGCTACAATGAGAATGAAAGCAGCAGCGAGGTGATAATGAGTCTACCCATGAGCTCATACAGCCTGGATGTT
I P W L R Y N E N E S S S E G D N E S T H E L I Q P G M F
1045 ATGCTGGATGGAAACAACAACCTGGAAGATGACTCCAGCGTGAGCGAAGACCTCGAAGTGGACTGGAGCCTGTTGATGGTTGCC
M L D G N N N L E D D S S V S E D L E V D W S L F D G F A
1132 GATGGCTGGAGTGGCGAAGCCATCTCTACGTGGATCTCAGTCCACCTACATGGCTGGAAAGAGCGTCTGGCCAGGCA
D G L G V A E A I S Y V D P Q F L T Y M A L E E R L A Q A
→ clone CH7

FIG. 3B

1219 ATGGAGACGGCCCTGGCACACTGGAGCTCTCGCCGTTGATGTCGAAGTGGCAACCCACAGCAAGGAGAGGATTGATGCC
M E T A L A H L E S L A V D V E V A N P P A S K E S I D A

1306 CTTCCCTGAGATCCTGGTACCCAGATCATGGTGGAGTGGCCAGGAATCTGTCCTATCTGCTGAGCGAATATCTGAAGGGG
L P E I L V T E D H G A V G Q E M C C P I C C S E Y V K G

1393 GAGGTGGCAACTGGTACCATGCCACACTATTCCAAAGGGCTGGCTCATGGCTTCAGAAGCTGGACCTGGCCAGTG
E V A T E L P G H H Y F H K P C V S I W L Q K S G T C P V

1480 TCCGGTGCATGTCCTCCCGCTCTAAAGCCAAGGCTCGTGTGTAACAGTCAGTCAGTCAATTAGACTAAAGTTGTTGATTCTCTGTGATTATTGGATG
C R C M F P P P L *

1567 TACTACAGGAGGCCCTTGTCTAAACTACATGAAACCACTGTAATTAGACTAAAGTTGTTGATTCTCTGTGATTATTGGATG

1654 TGAATATGGTTGTGACATTAAACATGACATTAAACATTCCTCGTTAGAAGGTAGAAAGGGAAAGGAAACTTCTAAATGGCT

1741 GCTTGAGATGGCAGTAAGAACATACATTTCATACCTGAAAGTGAACAAATCCCACATTGTTGTTGACTGTGTCCTCTTACCT

1828 GTTGGCTGAGGGTTACCTATCTGCTAAACTATGGAAAGACAAAAATTACCTTGTGCAATGCTCATGGTTAAATGTTCCGTATTT

1915 TCCAGCTGGCTAAAGCTTATTAAGCTTCTCTTGTGCTTGACCCCGAA
← primer D1

FIG. 4A

1 GGGCAACTGA AGGCAGATGA AGAGCCCTGC CCCTGCCAC ATGTGGAACC
51 TTGTGCTGTT CTTGCCTTCA CTGTTGGCTG TGCTTCCGAC CACTACTGCC
101 GAGAAGAATG GCATCGATAT CTACAGCCTC ACGGTGGACT CCCGGGTCTC
151 TTCCCGATTG GCCCATACTG TTGTCACCAG CCGGGTGGTC AACAGAGCCG
201 ATGCTGTTCA AGAACGACCC TTCCAAGTAG AGCTACCCAG GAAAGCCTTC
251 ATCACCAACT TCTCCATGAT CATCGATGGC GTGACCTACC CAGGGGTTGT
301 CAAAGAGAAG GCCGAAGCCC AGAAACAATA CAGTGCCGCC GTGGGCAGGG
351 GAGAGNGTGC TGGCATCGTC AAGACCACTG GGAGGCAGAC AGAGAAGTTT
401 GAAGTGTCAAG TCAACGTGGC CCCTGGTTCC AAGATTACCT TCGAACTCAT
451 ATACCAGGAA CTGCTCCAAA GGCGACTGGG AATGTATGAG CTACTCCTCA
501 AAGTGAGGCC TCAGCAGCTG GTGAAGCACC TTCAGATGGA CATCTACATC
551 TTTGAGCCTC AGGGTATTAG CATCCTGGAG ACAGAGAGCA CCCTCATGAC
601 CCCGGAGCTG GCAAATGCC C TTACCNCTTC ACAGAACAAAG ACCAAGGCTC
651 ATATCCGGTT CAAGCCGACG CTCTCCCAGC AACAGAAGTC TCAGAGTGAG
701 CAGGACACGG TGCTGAATGG GGACTTCATC GTCCGCTATG ATGTCAACCG
751 GTCTGACTCT GGGGGCTCCA TTCAGATTGA GGAAGGCTAC TTTGTGCACC
801 ACTTGCTCC AGAGAACCTT CCTACAATGT CCAAGAATGT GATCTTGTC
851 ATTGATAAAA GCGGATCTAT GTCAGGCAAG AAAATCCAGC AGACCCGAGA
901 AGCCCTAGTC AAGATCTTGA AAGACCTCAG CCCCCAAGAC CAGTTCAACC
951 TCATTGAGTT CAGTGGGAA GCAAACCAAT GGAAGCAGTC ACTGGTGCAA
1001 GCGACAGAAG AGAATTGAA CAAGGCTGTA AACTATGCTT CCAGGATCCG
1051 GGCTCACGGA GGGACCAACA TCAATANTGC AGTGCTGTTG GCTGTGGAGC
1101 TGCTGGACAG AAGCAACCAA GCTGAGCTAC TGCCCTCGAA GAGCGTCTCC
1151 CTTATCATCC TGCTCACGGA CGGTGACCCC ACTGTGGGAG AAACCAACCC
1201 CACGATTATC CAGAACAAACG TGCGGGAAAGC CATCAATGGG CAGTATAGCC
1251 TCTTCTGCCT GGGGTTCGGC TTTGATGTGA ACTATCCTT CCTGGAGAAG
1301 ATGGCACTGG ACAATGGTGG CCTGGCCAGG CGCATCTATG AGGATTTCAGA
1351 CTCTGCACTG CAGCTTCAGG ATTCTACCA CGAAGTAGCC AATCCACTGC
1401 TCTCATCAGT GGCTTCGAA TACCCCAGTG ATGCTGTGGA GGAAGTCACT
1451 CGGTACAAGT TCCAACACCA CTTTAAGGGC TCAGAGATGG TGGTGGCTGG
1501 GAAGCTCCAg GACCAGGGTC CTGATGTCTT CTTAGCCAAA GTCAGTGGGC
1551 AGATGCACAT GCAGAACATC ACTTTCCAAA CGGAGGCCAG CGTAGCCCAA
1601 CAAGAGAAGG AGTTAACAGAG CCCCAAGTAC ATCTTTCACA ActTTATGGA
1651 GAGACTGTGG GCActGCTGA CTATACAGCA ACAGCTGGAG CAGAGGATT
1701 CAGCGTCAGG TGCCGAATTG GAGGCCCTCG NGGCCCAAGT TCTGAACTTG
1751 TCACTCAAGT ACAATTGTTG CACCCCTCTC ACGCACATGG TGGTCACCAA
1801 ACCTGAAgGT CAAGAaCAAT TCCAAGTNGC TGAGAACGCT GTGGAAGTCG
1851 GTGATGGCAT GNAGAGACTC CCCTTAGCAG CTCAAGCCCA CCCCTTCAGG
1901 CCTCCTGTCA GAGGATCTAA ACTGATGACC GTGCTGAAAG GAAGCAGGTC
1951 CCAGATAACCC AGACGCGGTG ATGCCGTTAG GGCATCTAGG CAATACATTN

FIG. 4B

2001	CTCCCGGATT	CCCCGGACCT	CCTGGACCTC	CCGGATTTC	TGGCACCCCC
2051	GGACCTCTG	GATTNCCTGC	ACCCCTGGGA	CCTCCTCTTG	CTTCTGGCTC
2101	TGACTTCAGC	CTTCAGGCC	CCTATGAAAG	GATGCTAAC	CTGCCCTCCG
2151	TTGCAGCACA	ATATCCGGCT	GACCCACATC	GGTTTGTGAC	GGAAAAAAAGT
2201	AAAGAAAGCA	CCATACCGAGA	GAATCCCCN	AACCCAGACC	ACCCCCAGGT
2251	TCCTACTATT	ACCTTGGCGC	TTCCGGGATC	CAAGTGTGAC	CAGCTCTGTG
2301	TGGATATCTT	ACATTCTGAG	AAGCCCCATGA	AGCTGTTCGT	AGACCCCACT
2351	CAGGGTCTGG	AGGTGACTGG	TAAGTATGAG	AATACTGGGT	TCTCGTGGCT
2401	CGAAGTGACC	ATCCAGAAC	CTCACCTGCA	GTTCCATGCA	ACCCCTGAAAC
2451	GACTGGTGGT	GACACGAGGC	AGAAAANACA	CTGAATAACAA	GTGGAAGAAG
2501	ACGGCTGTTCT	CTGTGTTACC	TGGCTTGAAG	ATGACCATGA	ATATGATGGG
2551	ACTCCTACAG	CTCAGTGGCC	CAGACAAAGT	CACCATGGC	CTCCTGTC
2601	TGGATGACCC	TCAGAGAGGA	CTAATGCTGC	TTTGAATGA	CACCCAGCAC
2651	TTCTCCAACA	ACTGGAAAGG	GGAGCTTGGT	CAGTTTAC	GGGACATCGT
2701	CTGGGAGCCA	CCCGTCGAGC	CAGATAATAC	AAAACGGACA	GTCAAAGTTC
2751	AAGGAGTTGA	CTACCTGGCT	ACCAGAGGC	TCAAGTTGAG	TTACCAAGAA
2801	GGGTTCCAG	GAGCAGAGAT	TTCCCTGCTGG	ACAGTGGAGA	TATAGAACTG
2851	TAGGAGCGC	CGCTCCCTGC	CATGTTGTC	TCGTACGCAG	CCAGATGACA
2901	CCTTATGCCA	ACAGGGACGC	CTGTGAGGCC	GAGACCTTGA	TGGGAAGAGG
2951	ATGCTCCCTT	GTTACAAATA	AAGAAGGGCA	GTGTGAAACCC	GA

FIG. 5

GGTGGCCAAGAGCAGTTCACCTGCTCTGGGCAAGCCTGCTTGTG
TTTAGTGAGTCAGGGCCTCCCCAGGCAGTAAGATGTTGAGTGTGG
AGGCCAGGCCGCTGACCTGCAGCCCTGCCCCACAGGCAGGCTG
CATGCTCTTCCCCACATTCTCCTTGCAGGTGCGCGTGTGCTCATG
CTCCTGTACTCGTCTAAGAAGAAGATCTCATGGGCCTCATCCCCT
ACGACCAGAGCGGNTTCGTCAACGCCATACGACAGGTACATCACCAC
CCGCAAACAGGTGTGCCAGCTGAGGGTAGNCTGCTCCTGCTCCTAC
CCTTGGTAGACCCACTGNCTCCACTGGTGTGGAATGTGGCATCAA
GGCTGAGTCGGCGNCTGGGAGGAGCTGTGACGANGCAGTGCCATA
CCCAAATGGGCTCGAGGGAACNTAGCTTATAGGGTTCAGAGGGG
CAGAACTAGAGGGTGGGCCTGGGTAGAGGCAGGGCAGGAGTGG
GGTGGCAGGTTGGCAAGAGGCCAGAGTCTCTGGAGGGTCACAGT
GTTGATGACATCTTCTNAGAANCCTGCTACTNGCTTAGNCAGCTG
TGGCCTCTCTNCCACCTGGGGATACCTGGCNACAGGCNGTGGC
NNCGGGGGTGAANACTCTGGACCTGTTNAGANTGTCAACAAACAAAT
TCTTGACATGGAGTGGTGTATGGAGTGGNAGGAGGTGANCTGCCG
GGGACTGTGTGGACTGTTGNCCCTAACGCTGCCCTCCCTGAAGTGC
CTTCTCGCTCTGCCAAAACCCAGACCTGAGCCAACAGCCGGTC
CAAGAGGTGGCTGCCATCCCACGTCTATGTGAACCAAGGGGAGATC
CTGTGATTCCGGGTACCCCCGGGTGGCCCCATTGACAGTGCCGCC
CCCTGGGGAGGACTTCTGACTGATACTCCCTGTCTTGTGTGGCAG
GAGAACAGACCAGTGGCCTCGGAGGCTTCTGAGCTCATTCCC
CAGCAGTTGCTGGTGAGGGTCAGGGGATTCCAGGCTGGGGTGGG
CCAAAGACCCTGTGGTGGCTGGTTCAAGAGGCCTGCCTGGCTTCCC
CAGCAAGCTAGGGTCCATAAAGAAGCCCTCGGCCTTCCCCCAGAC
CACCTCGTGCCACTGTTCCCGGAATTC

FIG. 6A

GGCACGAGCTTAACGTGCTAACCTCTGTGATGATCATGTGTGATGAGTATGTGCTCT
CATTGATTGTGGAAAAAGAAAAGAAAAATCCGAAGGACACAAAGAGGACT
AATCTAAACCAGATATCTAGTAGTCACCAAAGCCACACTTGAATTGAAAAGCTT
AGCACTGTAGCTTAGCTATGCTATCTTTAAAGAGAGAATTAAATTATTAATATAT
GGAAGGACATTAGGCTAGTGTGTGGCACATGGTATAAACTCAATAATGGTGGAC
GTTATCAGTGTACTATAATGAGTTAATAATTGGTTCATCTCCTTAATCAGACC
AGTGTTCACTACTAGCTGGTCTCTGGAATAGGCACAGATATATTCACTGGAGTGT
ACACATACTCTGTGCGCGAAAGAGTCAGAATAGCCCTCAATAAGCCAATTACTCTT
GCTGTCATCCTATTCTTAACCTTCCCTAGCGTGCTTTATGTATCAAACCTTCT
TCCTTATTACGTAATACTTTAATGACAACCTCTAGAAATAAGAACTATACCTA
AAAGATTGAAATATTCTTAGTTCTTATCTACATCAGAAATTGTTAGCTGATA
ACATACTTATATTGTTAAGGAATTCTGTTAATACCTTGTTATTATAATTTCATA
GTTTATTGTATTAATAGGAACCTTACAAAGAATGTATAGAAAATAAGCCCCATCAT
TTGTCAGTGTGACAATTTCAGTGTAAATTGTTAAGCTGTTGACCCCTATAT
AAGCTCTGTCCTCTTGGCCCTTCCCCCTAGCCTAAATCTCCATTGCTGACG
ATCTCTCCCTGACAAATGCCTGCTCTGCGCACTGAGTCACAGTCTACTAAATGC
ATTCCATTGTGCCCATGTCCTCTTAATGTGATGACCCAGACATGACCAGGGCAGAG
CACAGAGGGAGCATCACTTCTTGACCAGAGCATCTATTCCAGCAATGCAGCCTA
AGGTACACATTAGCATTGGCAGCAAAATACACCCCTGGCTATGCTGTATGCTGT
CAACCAAATCCTCCATGACTTTACATGAACCTCCATTAAATAAGGCTCCACAT
CCGGTACGAATATAGACAGTAATGTGAGTCAGTCTGGTGAAGTTATTACATA
TTAACACATCAGCTAATCTATATTATTATTAGAATATTGAGACAGATTCTATTCC
CAGCTATATAGATATGGTTAGAATACTTTATTATTATTTTAATGTTCTTCT
GAACCCGATAAGAACATAGTCCCAGACAATCTTAAGTCAGAGTCTACAGTTGT
ATAGAGACCTAGAGGCTAGCTATATTCTTAGACATCAACACATCATCAGATAGGA
TCCACCCAAGGCCTTACAAATCCTGTATACTGAAATGCCTTCTGACGATATTCT
GGAGACTGTTAAGTGAATGCGCAGATCTGAACCGAGCCGAGCCTGAGTGGGAAGA
GCTAAAGCATGGCAGTTGTCATCAATGATGGAGTCTTCATTATGTTCTC
AGACACATGCTCAGCCCTGGGTCTCAAAACTCTCATGCTCGGCCCTGGGTCTCACA
CTCCTGGCTCCGAGTGGTCATAGCTAACGACCTCTCACACTAAATCCCAGGATGAG
CTCATGTTGATGTTCTGCTTGCTCTGAAATTGGCAGTTCTCGTGGAAAAAAA
TCTACTTATACGTGTGCTTCATAAGCAACTCGGTAGCAGGGCTTAGGGGTGCTC
GAGTGTGGCAGTGTAGAGAACCGATAAGCGAAATCTATGATATCTCATACATC
ATTAAATTATTAAATTACTTTGTTAGTACACAAAAGTATTGTTAGTACACCC
TTTATCTATGTGTACTCTACCTTCGCATACACTGACTCATTCTTTCTCCTCA
CCCACCTGATGAGCTGCTCTCCTCCAGACAAGCTCTGGCAGTTAAAGTCACGTG
TGTATCTTTAACTCTAGCTCTGCCTATTAGACAAAACAAGATACTGTCTTCT
CATCTCCCTCCTTTGTTAATTCTCCTCCAGCCCTACATGGATCCCCCTGACCTCGT
GTCATATCTAAATCTGTATAAAAGAGATGATTAAATCTACGTTCTATGTACAA
AAGAGAATATAATGCTCGTCTTCTGAATCTGTCTATTGGTTCACACAATATCT

FIG. 6B

GCTCTCTTTACCGCAAATGGTATCATCTCGTTCCCTTACACGTTGAAGAAAATTTC
ATTTTGTGTTGTTGTTGTTGTTGTTGTTGTTGTTGTTGTTGTTGTTGTTGTTGTTGTTG
AGGAACATCAAGGCCAAGATAATGGATCTTGGCTATTGTAAGAGTGTAGTAAGAAC
ACAACCGTATAATCATCTTCTGTTGATGCTGGCATGCTGGCTACAACTCCTACACCTGTC
TACCCAGAGTGGAGGCTGGACCACATGGTAATGCAACCTGTTAGTTATTAAATATG
GTACTTCTTGTATAATGTTAAAGATACTACTTATTAAATGTTATGTTATGGATGTT
TTATCTATGTTGTCTGTTATAGTGGCACGTTACCTGGTCTCAGGCCAGAGGAAG
GCATCAGAGTCCCTGGGTCTTCAAGAGCAGCCAGTGGTACCTGGCTGTATCCTG
GACTTCAAACCCGGGTCTTCAAGAGCAGCCAGTGGTACCTGGCTGTATCCTG
TCCAGGCCTCATCGCTGATTAGGAAGGACTTTACTGATTGGACTAGCTGTAGGCAA
TGCAGTCTATGACGATTCTTCTAGCAGTTCTTCTTAATGATAGCCATA
CTGATTGCTGAGATTACAGCAGCACTAGCAAAGCTGGAA

FIG. 7

CTCGAGTTTTTTTTTTT GGAGAAGGGNAACATTATTCAATT 50
AACAAATNTTGTGACCTGATGGGNAGATAACTGAGCTAGTCAGCGCGT 100
AGGTAGCAAACATAAGGNTATACTACCCAGNTAATGGTCTNCCCACATG 150
TCACTGAAGGAGTGTCAAGTCTCAGCATTACCTTAATTAAATT 200
ACCTCTAAATGCGCTTTAGGAGGCTACCCACAGTGTGATGACAAACAGTGT 250
AGCAGGCATGCCAGAACTGTTACCAAGCAGAAACTTTGGCCGACTGTAGC 300
TGGCAGTGTCTCACTAGTGCAGTTCACTGCCCTGGTTAACTAGGGT 350
ACACAGAAGTCACTTGAACTCTTGCTTAACTAATAAGCCAAATAAAC 400
AATCATGAAATAACTGATAGCAATTAGCAATTTCATGGCATGGAAAGAG 450
CTTCGACTTCTCCATCGGTGACAGGGAGCAGCTTCTGGAAAGGAAGGTCTG 500
GAGAAAACAAAGTGAACGGGGAGCTCCGAGGAGCCCTGAACACAGTCACCTCAA 550
CAGCACTGGCGTTGACACAGCTGCTGTGGTCCAGCAGTCAGTCAGTGGAG 600
AGTGCCTAAAGGGTGGCAGACAGNCAGNCCTACTTCACTCTCAGGAT 650
GGCACTTCCAGGCCAACGGTTCTAGCACTACAGATGTTGCAGTATTGTG 700
CAGGAGCATTCACTGCTCGGCATAGGCAGGCAACTCTTGGAACATGTGC 750
CGGCAGTGGAAAGAACACCACGGCTGAAGGGCTTCNCTGCATCTGTGGAG 800
GATGGGAGAAAGGCATGATTCAACAGATATTCTCTTCATCAACCGAAACGGC 850
CTTTCATTTGGGTTCGGNGCATTTCAGCCCTCCCCAAGCAGAAATCTTCAGTTA 900
GCCTACCGAGGATTTCAGGAAATCTCAAAATTGGAAATCTCCATTCA 950
ATCTTGCAAGAATTAAACCAAGGAATCTCAAAATTGGAAATCTCCATTCA 1000
CTTCCTTAATTGGTGGATAAGTAGAAATGGTGGCTCACATGTGTGCCAATG 1050
TTGTTCAACAAGCCAGTGAATAATTGGTGGATGGAGTATAAGAAT 1100
CAGATCTCTCGTGGCGAATTCA 1122

FIG. 8

CTCGAGGAGATGCCCAACAGTCCCTCAGGCCAGTCAGGTAATCTGCCT 50
TTGGCCTTAGTGACCTCCCTTTCTGGCGAGTACCATCCACTTCCCTC 100
CCTGACAGGCAGTTCAAGTAACCCAAACCCCTTCATTCCCTCAGTTGTC 150
AAAGACAAGTTAACATCCAAGACTAACAAAGCAAGATGACTCAGGAGCATG 200
GNCTCTGGTTCCCCCTGGCACCATGCATGGTAGCTGCTAGTTAAGGCTGAC 250
TTAGCTCTTAGCAACCTTGGTAGGATAAGCTTAAGGCTCATCTCCACCTTC 300
CTACCAAACAGAAAAGAATTGAGTCTCTGCTATGAGGCTCTCGCTCC 350
CATCTCAGGGAGGCTCCTGCCCTCACCCAAAGCTGGGAGGTAGAGTTA 400
TGGAGGGCAAGGAAGCAGGACTGGAAAGATAAGACTTATGGATCCACCA 450
CTCATAAAGTCACAAAGTCCCCCTCACACCTGCTAGACTCTAAAT 500
CATTACGTTGTCACCAACAGAGGTGACTCCTCAACCACAAGAGCCTGTAG 550
TGAGCTTCAAGAGAGAGGACAAGNCAGACCTGGACTGCTGATGACCTTG 600
CACCTGATGAAGTCACAGCAATAGGTGATGCTCAAAAGCCCCAATAA 650
AATGCAAGACAGNCAACAGAAGGCCCTGTCTCCTGGTGGTAAT 700
GTAGGCTGATGGCTCAGTGCCCTCCTTGGACTTCAACCCTGACTATGGGA 750
ATTGTCCTTCAAGTGCCCTCCTGGGAATTTC 779

FIG. 9

FIG. 10

CTCGAGATGCATTAAAGCTTTGNTGCAGAAGGATCCGAGCTGTGTCCCTGTG 50
TGTGTGTCCCTCACTGGCGAGCCCTTATCACACAGGGACACCCCTTAGG 100
TTGGAGTTTCCTTGTAAATGTCCCACTTACGTTCTGCTTTATACAATAATA 150
TTGNTTAAATTGNTCTATCATGAAATAACTCACTTCCCTATCTGTAT 200
TGATTGAAAGTTTGGATGTAATAGTTGGCTTGGATCTGAAGTCT 250
TTTAGAGTTTATTGGACATGTGCCCTNGATTCAATTGGNTTNAAAATCNTCC 300
ACNACTTGGGGTGTAAAGGTACCCACNCNATTANTGGAGGTCTCTG 350
AGTCAGAGANAANGANTGAGCCACCNGGAATTCT 400
CCCTAAACACACTTTGATCATTCCCTGCCTAACCCCTGCAGAGGAATAT 1550
TAATACCCCTGTAGTACCAAGGAACAAATAAGAAGGAAGACTGNTCTCT 1600
CATGTCTGGAGGTGGTGAAGGGAGTCTCTGTTGCTCACATAGGA 1650
GAGATCTAATACGCCACTATCCATAATTAAAATCTGTGAGAGGGC 1700
ATGACCGAGGTTCTCCAGTGTCAAGGGATGTGAATATGTTNNCCCTG 1750

FIG. 11

GAATTGCNTTGGGTACATGGACCNNGAGAGCTTGGNTACATGGCCTG
GAGAGCTGGNTACATGGCCGGNGAGCTGGTTINATAAACCTGGGANGT
TGGGTTNAATGGCCCCGGGGANGTNGGTTNAATANACCNNGGGAGG . . .
50 100 146 200 250 300 350 400 450 500
TGTCTGAAAANAGTGGNCACGTACT
.
GTTCTCAGACCCAGNGGAAGNCATCAGAGTCCCCCTGGGGTTGGAATTAAA
GATGTTGTGAGTCNCTGGGTGTATCCTGGACCTCAAACCCGGGTCTTCT
TCAAGAGCAGCCAGTGCCTTAACCACTGAGGGATCTCTCCAGCCTCATC
GCTGATTAGGAAGGACTTTACTGATTGGAGTANCTGTAGCCAATNCA
GTCTATGACGGATTCCCTTTAGCAGTTCTTCTTAATGATA
CCATACTGATTGCTGAGATTACAGCAGCACTAGCAAGCTGGAACTCCGAG

FIG. 12

- EMBRYONIC LIVER FODRIN OR BETA SPECTRIN, *e/f* 1,2 & 3
- SPECTRINS ESTABLISH AND MAINTAIN EPITHELIAL MEMBRANE SKELETON, CELL POLARITY, SPECIALIZED-CELL DOMAINS: AE2

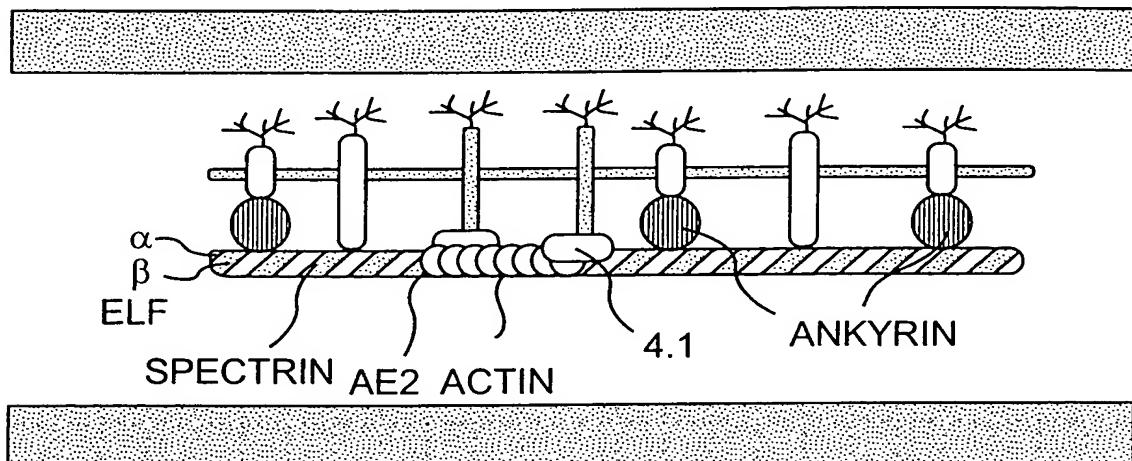


FIG. 13

GRAPHIC REPRESENTATION OF KNOWN ALTERNATIVELY SPliced PATTERNS FOUND AMONG *e/f* TRANSCRIPTS

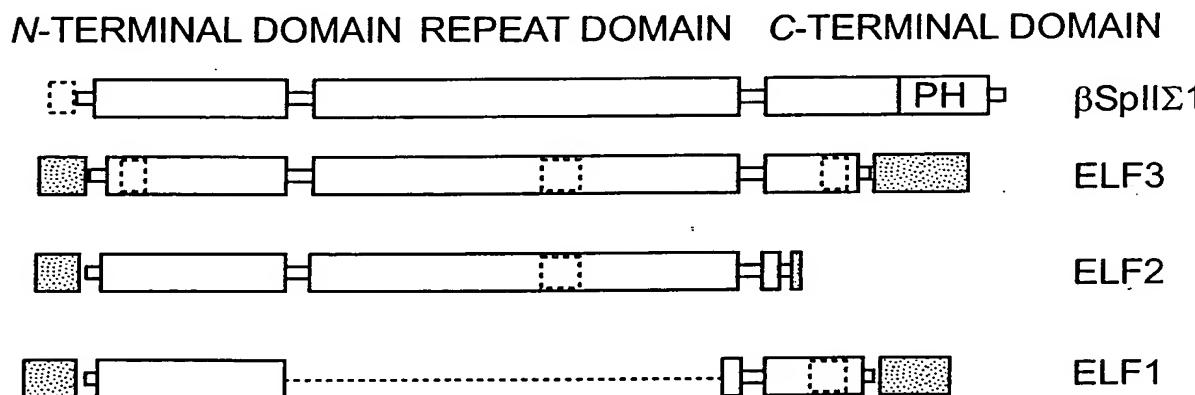


FIG. 14

ELF LABELING IN
PRIMARY BILLARY
CIRRHOSIS



FIG. 15A

ELF LABELING IN
PRIMARY BILLARY
CIRRHOSIS

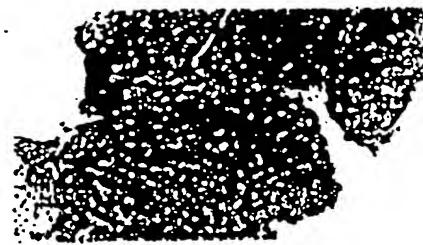


FIG. 15B

ELF LABELING IN
PRIMARY BILLARY
CIRRHOSIS



FIG. 15C

ELF LABELING IN
PRIMARY BILLARY
CIRRHOSIS



FIG. 15D

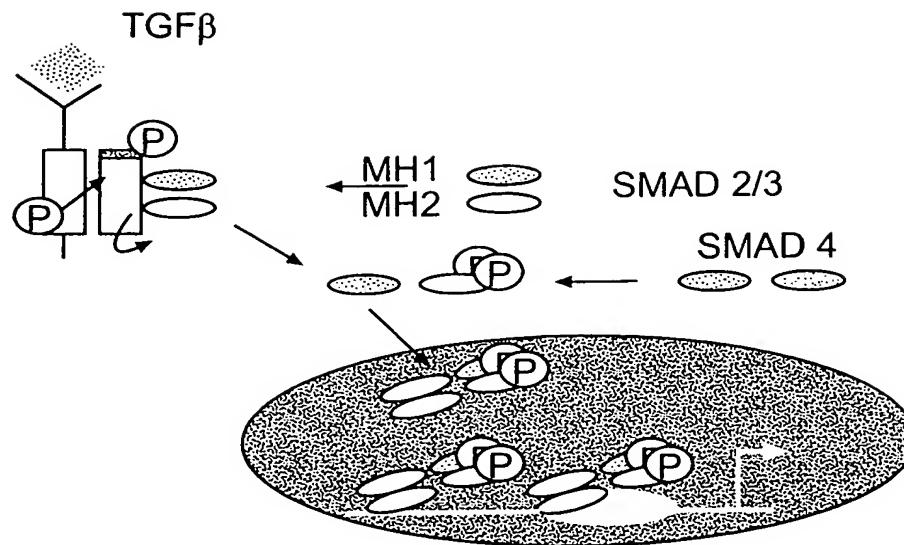


FIG. 16

α =FETO PROTEIN LABELING CELLS OF HEPATOCYTIC LINEAGE IN WILD TYPE VS. SMAD2 $^{+/-}$ /SMAD3 $^{+/-}$

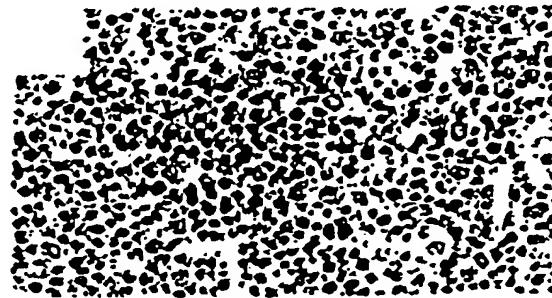


FIG. 17A

α =FETO PROTEIN LABELING CELLS OF HEPATOCYTIC LINEAGE IN WILD TYPE VS. SMAD2 $^{+/-}$ /SMAD3 $^{+/-}$



FIG. 17B

SMAD 2 & SMAD 3 MUTANT EXPLANTS SHOWED INCREASED APOPTOSIS AND VERY FEW VIABLE HEPATIC TISSUE

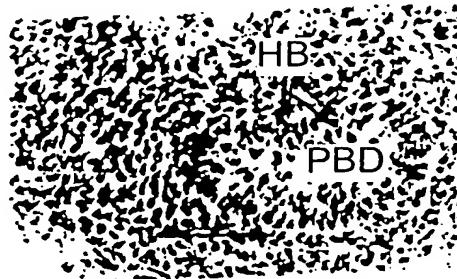


FIG. 18A

SMAD 2 & SMAD 3 MUTANT EXPLANTS SHOWED INCREASED APOPTOSIS AND VERY FEW VIABLE HEPATIC TISSUE



FIG. 18B

HGF TREATMENT RESCUES PHENOTYPE OF MUTANT LIVER EXPLANTS AS SHOWN BY CYTOKERATIN LABELING



FIG. 19A

HGF TREATMENT RESCUES PHENOTYPE OF MUTANT LIVER EXPLANTS AS SHOWN BY CYTOKERATIN LABELING



FIG. 19B

HGF TREATMENT RESCUES PHENOTYPE OF MUTANT LIVER EXPLANTS AS SHOWN BY CYTOKERATIN LABELING

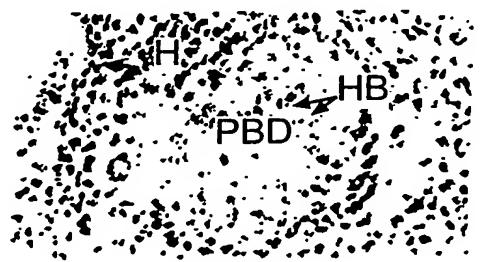


FIG. 19C